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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/668,664	09/22/2000	Paul Petrus	015685.P068	2261

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EXAMINER	
SMITH, SHEILA B	

ART UNIT	PAPER NUMBER
2617	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/668,664	PETRUS, PAUL	
	Examiner	**Art Unit**	
	Sheila B. Smith	2681	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

1. Claims 25-33 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are directed to non-statutory subject matter because the methods merely manipulate an abstract idea or solves a purely mathematical problem without producing a useful, concrete and tangible result.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-6,16-42, are rejected under 35 U.S.C. 103(a) as being unpatentable over Youssefmir et al. (U. S. Patent Number 6,141,567) in view of Hoshino (U.S. Patent Number 6,285,891).

Regarding claims 1,2, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses apparatus and method for beamforming in a changing-interference environment. In addition Youssefmir et al. discloses a method of characterizing an environment comprising receiving uplink signals, estimating uplink spatial signatures characterizing the environment based on uplink signatures

(which reads on column 2 lines 1-16). However Youssefmir et al. fail to disclose a plurality of predetermined environments.

In the same field of invention Hoshino discloses radio communication apparatus having a plurality of communication functions. Hoshino discloses disclose a plurality of predetermined environments as disclosed in column 19 lines 10-15.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Youssefmir et al. with a plurality of predetermined environments as taught by Hoshino for the purpose of extending the range of coverage.

Regarding claims 3, Youssefmir et al. discloses everything claimed, as applied above (see claim 1) additionally, Youssefmir et al. discloses identifying the cross correlation between the antenna signal and the reference signal as disclosed in column 14 lines 38-45 reads on selecting a clutter estimation if the correlation between the estimated uplink spatial signature (which reads on column 2 lines 1-16).

Regarding claim 4 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses calculating the geometric uplink spatial signature comprises estimating a dominate angle of arrival of the uplink signals received by the plurality of antenna array element calculating an uplink spatial signature of the received uplink signals using the estimated dominant angle of arrival (which reads on column 2 lines 1-16).

Regarding claim 5 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses finding the correlation

between comprises calculating a normalized dot product of the estimated uplink spatial signature and the geometric uplink spatial signature (which reads on column 2 lines 1-16).

Regarding claims 6 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses estimating the uplink spatial and a reference signal (which reads on column 2 lines 1-16).

Regarding claim 16 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses a plurality of antenna elements (103), a receiver (107) coupled to receive uplink signals from the plurality of antenna elements, and a signal processor coupled to the receiver (which reads on column 17 and lines 5-16), the signal processor receive the uplink signals to select an estimation of an environment responsive to the uplink signals received by the plurality of antennal elements (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 17 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses a memory coupled to the receive and the signal processor to store uplink signals received from the plurality of antenna elements (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 18, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses the signal processor is coupled to select a low clutter environment estimation if a correlation between an estimated uplink spatial signature and a geometric uplink spatial signature is greater than a low clutter estimation threshold (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 19, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses the signal processor is coupled to calculate the geometric uplink spatial signature responsive to a dominant angle of arrival estimated by the signal processor responsive to the uplink signals received from the plurality of antenna elements (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 20 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses the signal processor is coupled to select a high clutter environment estimation if an average of absolute values of pairwise correlations of the uplink signals received from the plurality of antenna elements is less than a high clutter estimation threshold (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 21, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses the signal processor is coupled to calculate said pairwise correlations of the uplink signals received from the plurality of antenna elements by calculating normalized dot products for pairs of the antenna elements (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claims 22-24 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses the signal processor is coupled to select a high interference environment estimation if an estimated source order responsive to the uplink signals received from the plurality of antenna elements is greater than a

high interference estimation threshold (which reads on column 2 and lines 1-16 and exhibited in figures 2 and 4).

Regarding claim 25, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium having stored thereon instructions, which when executed cause: receiving uplink signals from a plurality of antenna array elements, storing the uplink signals received from the plurality of antenna array elements selecting an estimation of an environment responsive to the uplink signal received from the plurality of antenna elements (which reads on column 17 and lines 5-16).

Regarding claims 26,28 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium selecting the estimation of the environment comprises estimating an uplink spatial signature responsive to the uplink signals received from the plurality of antenna array elements, estimating a dominant angle of arrival responsive to the uplink signals received from the plurality of antenna array elements, calculating a geometric uplink spatial signature responsive to the uplink signals received from the plurality of antenna array elements and the estimated dominant angle of arrival, finding a correlation between the estimated uplink spatial signature and the geometric spatial signature, and selecting a low clutter environment estimation if the correlation between the estimated uplink spatial signature and the geometric spatial signature is greater than a low clutter threshold (which reads on column 17 and lines 5-16).

Regarding claims 27-29, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-

readable medium finding the correlation between the estimated uplink spatial signature and the geometric spatial signature comprises calculating a normalized dot product between the estimated uplink spatial signature and the geometric spatial signature (which reads on column 17 and lines 5-16).

Regarding claims 30-33 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium selecting the estimation of the environment comprises. calculating pairwise correlations of the uplink signals received from the plurality of antenna array elements, calculating an average of absolute values of pairwise correlations of the uplink signals received by the plurality of antenna array elements and selecting a high clutter environment estimation if the average of the absolute values of pairwise correlation of the uplink signals received by the plurality of antenna array elements in less that a high clutter threshold (which reads on column 17 and lines 5-16).

Regarding claims 34-37, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium selecting the estimation of the environment comprises. estimating an uplink spatial signature responsive to the uplink signals received from the plurality of antenna array elements, estimating a dominant angle of arrival responsive to the uplink signals received from the plurality of antenna array elements, calculating a geometric uplink spatial signature responsive to the uplink signals received from the plurality of antenna array elements and the estimated dominant angle of arrival, finding a correlation between the estimated uplink spatial signature and the geometric spatial signature, and selecting a low clutter environment estimation if the

correlation between the estimated uplink spatial signature and the geometric spatial signature is greater than a low clutter threshold (which reads on column 17 and lines 5-16).

Regarding claim 38, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium having stored thereon instructions, which when executed cause: receiving uplink signals from a plurality of antenna array elements, storing the uplink signals received from the plurality of antenna array elements selecting an estimation of an environment responsive to the uplink signal received from the plurality of antenna elements (which reads on column 17 and lines 5-16).

Regarding claims 39,40, Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium finding the correlation between the estimated uplink spatial signature and the geometric spatial signature comprises calculating a normalized dot product between the estimated uplink spatial signature and the geometric spatial signature (which reads on column 17 and lines 5-16).

Regarding claims 41,42 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses machine-readable medium selecting the estimation of the environment comprises calculating pairwise correlations of the uplink signals received from the plurality of antenna array elements, calculating an average of absolute values of pairwise correlations of the uplink signals received by the plurality of antenna array elements and selecting a high clutter environment estimation if the

average of the absolute values of pairwise correlation of the uplink signals received by the plurality of antenna array elements in less that a high clutter threshold (which reads on column 17 and lines 5-16).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7-12 rejected under 35 U.S.C. 103(a) as being obvious over Youssefmir et al. in view of Barratt et al. (U. S. Patent Number 6,185,440).

***Regarding claim** 7,* Youssefmir et al. discloses everything claimed, as applied above (see claim 1) additionally, Youssefmir et al. discloses When the average measure between each representative weight vector and all the weight vectors combined with that representative weight vector is less than some threshold, column 14 lines 38-45 reads on selecting a clutter estimation if the correlation between the estimated uplink spatial signature. However Youssefmir et al. fail to disclose representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal.

In the same field of invention Barratt et al. discloses method for sequentially transmitting a downlink signal from a communication station the has an antenna array to achieve an

omindirectional radiation Barratt et al. discloses the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as disclosed in column 7 lines 30, which reads on calculating pairwise correlations.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Youssefmir et al. with the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as taught by Barratt et al. for the purpose of extending the range of coverage.

Regarding claim 8 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses correlations of the uplink signals received by the plurality of antenna array elements comprises calculating a normalized dot product for said pairwise correlations of the uplink signals received by the plurality of antenna array elements (which reads on column 2 lines 1-16).

Regarding claim 9 Youssefmir et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. discloses an environment, comprising: receiving uplink signals from a plurality of antenna array elements, calculating a correlation matrix from the uplink signals received by the plurality of antenna array elements, estimating a source order from the correlation matrix, and selecting a high interference environment estimation if the estimated source order is greater than a high interference threshold (which reads on column 2 lines 1-16).

Regarding claim 10, Youssefmir et al. discloses everything claimed, as applied above (see claim 1) additionally, Youssefmir et al. discloses performing Eigen values as disclosed in column 15 lines 15-20.

Regarding claims 11, 12, Youssefmir et al. discloses everything claimed, as applied above (see claim 1) additionally, Youssefmir et al. discloses estimating the source order in response to the correlation matrix comprises: calculating Eigen values of the correlation matrix and performing an Akalke information Criteria technique on the Eigen values to estimate the source order (which reads on column 15 lines 15-20).

4. Claims 13-15 are rejected under 35 U.S.C. 103(a) as being obvious over Youssefmir et al. in view of Barratt et al. and further in view of Karlsson et al.(U. S. Patent Number 6,167,039).

Regarding claim 13, Youssefmir et al. In view of Barratt et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. in view of Barratt et al. discloses apparatus and method for beamforming in a changing-interference environment. In addition Youssefmir et al. in view of Barratt et al. discloses a method of characterizing an environment comprising receiving uplink signals, calculating signal to noise ratio in response to uplink as disclosed in column 2 lines 1-16. However Youssefmir et al. fail to disclose bit error rate.

In the same field of invention Barratt et al. discloses method for sequentially transmitting a downlink signal from a communication station the has an antenna array to achieve an

omindirectional radiation Barratt et al. discloses the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as disclosed in column 7 lines 30, which reads on calculating pairwise correlations.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Youssefmir et al. with the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as taught by Barratt et al. for the purpose of extending the range of coverage.

Regarding claim 14, Youssefmir et al. In view of Barratt et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. in view of Barratt et al. discloses apparatus and method for beamforming in a changing-interference environment. In addition Youssefmir et al. in view of Barratt et al. discloses a method of characterizing an environment comprising receiving uplink signals, calculating signal to noise ratio in response to uplink signals received from the plurality of antenna array (which reads on column 2 lines 1-16), measuring a received rssi in response to the uplink signals received from the plurality of antenna array elements and measuring noise included in the uplink signals received from the plurality of antenna array elements (which reads on column 2 lines 1-16).

Regarding claim 15, Youssefmir et al. In view of Barratt et al. discloses essentially all the claimed invention as set fourth in the instant application, further Youssefmir et al. in view of Barratt et al. discloses apparatus and method for beamforming in a changing-interference environment. In addition Youssefmir et al. in view of Barratt et al. discloses a selecting the

high interference environment estimation if the measured is a threshold amount greater than the expected RSSI is greater that a threshold value (which reads on column 2 lines 1-16). However Youssefmir et al. fail to disclose bit error rate.

In the same field of invention Barratt et al. discloses method for sequentially transmitting a downlink signal from a communication station the has an antenna array to achieve an omindirectional radiation Barratt et al. discloses the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as disclosed in column 7 lines 30, which reads on calculating pairwise correlations.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Youssefmir et al. with the representative weight vectors achieving this are the final representative weight vectors used as the representative weight vectors for sequential transmission of the downlink signal as taught by Barratt et al. for the purpose of extending the range of coverage.

Response to Arguments

5. Applicant's arguments with respect to claims 1-42 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheila B. Smith whose telephone number is (571)272-7847. The examiner can normally be reached on Monday-Thursday 6:00 am - 3:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on 571-272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Smith S. Sm
February 15. 2005

Temica M. Beamer
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PRIMARY EXAMINER
2/21/06